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ABSTRACT

This study examined university curricular reform, explaining how teacher education programs must create innovative curricular redesign to promote the development of students' critical thinking, problem solving, and decision making skills. The study highlighted a school of education in the process of curriculum redesign, using observation, interviews with key stakeholders, and examination of written records kept during the process. The interviews occurred at the university and at four other universities, each of which was diverse and had a connection with the primary site. Results indicated that major curricular changes within the five sites were based on strong beliefs about what constitutes best educational practices. Each school had strong beliefs about encouraging higher order thinking and decision making skills. Each school was moving away from lecture-based to more inquiry-based programs. Barriers to change included faculty fearing job loss, insecurity with new teaching methods, attachment to the status quo, and suspicion of unknown processes. Successful curricular redesigns addressed all of the barriers. Individual resistance had to be overcome for innovations to occur. Involvement of the entire faculty was essential. Faculty members worked collaboratively to establish common goals. Four areas necessary for successful change are: seeking paths to personal mastery and challenges to existing mental models; viewing team learning and shared vision as essential; making change systemic; and having supportive, not directive, leaders. (Contains 38 references.) (SM)

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A systemic Approach to Creating and Implementing Curricular Innovation

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A Systemic Approach to Creating and Implementing Curricular Innovation

Carol Dean, Michele Acker-Hocevar, Julie Laible

The issue of *what* and *how* to teach has been debated for centuries. At no time has there been a general agreement either the *what* or the *how*. Once again, at the close of the 20th century, Americans are focusing on the country's educational institutions as a national priority. With rising concerns over educational effectiveness and the recognition of an unprecedented knowledge explosion, many educators now believe the main purpose of education is to foster critical thinking, problem-solving, and decision-making skills (Boyer, 1995; Cummings, 1989; Penick, 1989; Relan & Kimpston, 1991).

Many educators are proposing curricular restructuring to develop these skills and to make education more meaningful to students. For K-12 schools to move to this new type of curricula, teachers must be prepared to implement new models of instruction. It is the responsibility of teacher preparation institutions to prepare entering teachers with a new curricular focus, one that holds relevance to students and fosters problem-solving and decision-making skills (Cohen, 1978; Goodlad, 1984; Relan & Kimpston). This change calls for major reforms in teacher education programs (Edmundson, 1990; Goodlad, 1984; Sarason, 1993).

The process of change is complex. Numerous studies and books note factors related to change and propose elements critical to creating and implementing successful innovation. Many researchers contend school reform efforts are unsuccessful due to the failure of reformers to understand the change process rather than to the inappropriateness of the change itself. Fullan and Miles (1992) contend, "No change would be more

fundamental than a dramatic expansion of the capacity of individuals and organizations to deal with change" (p. 745).

Peter Senge (1990) proposes an approach to the creation of change based on his belief in the systemic nature of the universe. He suggests institutions become learning organizations to better facilitate the process of continuous change. According to Senge, for persons to create a learning organization they must master five disciplines: personal mastery, shared mental models, building a common vision, team learning, and systems thinking. He believes the use of these skills to expands patterns of thinking while "learning how to learn together" (p. 3) which is imperative if innovations are going to take hold.

If true innovations in education are to take place, curricula must be restructured, and teacher preparation institutions must lead the way. This paper summarizes a qualitative study of the creation of curricular innovations in institutions of higher learning. The purpose of the study was to explore curricular reform and determine if factors could be identified that would aid administrators of teacher education programs in creating more effective curricular redesigns.

Rationale for Curricular Redesign

The debate about what and how to teach has persisted since the height of the Greek civilization. In the 19th and 20th centuries, the lines grew more distinct. Most of the 20th century was dominated by two major learning theories, both of which are outgrowths of psychology. One of these is behaviorism, and the other is cognitive learning theory. Although behaviorism dominated education for most of the 20th century, an understanding of cognitive psychology began to have a significant impact on the educational community.

More and more educators came to understand that "the whole is more than the sum of its parts" (Hergenhahn, 1982, p. 245).

Brain research conducted during recent decades confirms the view that learning is holistic and, therefore, supports the need for more integrated learning (Sylwester, 1995; Caine & Caine, 1995; Lowery, 1991). Gardner (1983) argues against the widely accepted concept of one intelligence delineated by a number derived from an IQ test. He suggests the existence of seven intelligences—linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, and intrapersonal. Each of these is located on a separate area of the brain, but all function interactively for learning and problem-solving.

All of these theorists hold some common views of learning in terms of brain theory. All see the need for learners to interact with their environment, believe learning should be holistic and integrated, and value problem-solving and higher order thinking skills as primary outcomes of learning.

Boyer (1995) poses the question, "What, then, does it mean to be an educated person?" (p. 16). A variety of studies and reports from leading professional organizations demonstrate an unusual consensus of opinion (McTighe & Schollenberger, 1991). The studies call for an increased emphasis on thinking rather than the accumulation of facts.

Reports from the National Assessment of Educational Progress (NAEP) indicate that, although there is evidence of progress in student achievement in the areas of reading, math, and writing, these gains are primarily at the lower levels of achievement. NAEP suggests that "the educational system in this country needs to extend its focus from the teaching and learning of skills and content to include an emphasis on the purposeful use of skills and knowledge" (Applebee, Langer, & Mullis, 1991).

In his extensive study of American schools, Goodlad (1984) decries the lack of student participation, involvement in learning, and excitement found in schools by this research. In spite of district goals that often include thinking and problem-solving skills, Goodlad found a predominance of lecturing, questioning, monitoring, seatwork, and testing that focused on the lowest levels of learning.

Wilson (1991) reports on a 3-year collaborative project to develop a curriculum to meet the needs of learners for the 21st century. This project, based on a Delphi study of approximately 150 national business, government, and educational leaders, assessed trends and made recommendations for appropriate curriculum restructuring and design. This group of leaders was united in a call for graduates who are prepared for an ever-changing future, lifelong learners who have the ability to access information and assimilate it to solve problems.

Leading professional organizations have demonstrated their commitment to fostering problem-solving and higher order thinking skills as a priority for the future. The national councils of mathematics, English, science and social studies and the Association for Supervision and Curriculum Development include these skills in their recommendations for professional standards (McTighe & Schollenberger, 1991). The new business paradigm supports the emphasis on integrated learning and problem solving. Senge (1990) states that education must be about seeing the interconnectedness of all disciplines as well as our connectedness within the world. A translation of W. Edwards Deming's well-known 14 points emphasizes a systemic view with an emphasis on cross-disciplinary, hands-on learning, a variety of assessment techniques, and cooperation between all parties involved in the learning process (Forester, 1994).

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Goodlad (1984) asks the question, "What do Americans want from their schools?" (p. 244). He states that if educators believe that learning should go beyond recalling facts and computation, they must restructure education. "No longer will it be sufficient to teach some facts of geography, a little algebra, or the mechanics of language. The school will become a means for learning that will transcend them" (p. 244). In other words, schools must transform their roles of being imparters of information to that of knowledge constructors.

Teacher Education Programs

As the need for a focus on higher order thinking and decision-making skills becomes more widely accepted, the problem emerges of how to implement these skills in the classroom. It is clear that teachers must assume enormous new responsibilities. Penick (1989) notes that it is the teacher that must be prepared to structure a problem-based approach. He points out that teachers most often teach the way they were taught, and very few teachers have experience in problem-based learning in the classroom.

Goodlad (1984) postulates that a primary reason for the failure of education reform in the 1950s and 1960s was "that the movement never became linked to the structures and institutions preparing and certifying teachers" (p. 293). Teachers entering the classroom were not prepared to implement an innovative curriculum. This continues to be the case. A study conducted by the University of Washington on teacher education programs found that teacher education in the country is quite uniform (Edmundson, 1990). Another study found that requirements of state licensing agencies showed relatively little difference from state to state. These agencies have not changed

significantly over the past 10 years in spite of public dissatisfaction with education (Evans, Dumas, & Weible, 1991).

Goodlad (1984) concludes that "teacher education programs are disturbingly alike and almost uniformly inadequate" (p. 315). He suggests that the improvement of schools depends upon innovative preparation of teachers. He calls for major restructuring in the way teachers are prepared. According to Goodlad, "The relatively minor adjustments of the past have proven to be futile" (p. 317). The report from the Carnegie Forum on Education and the Economy (1986) calls for a new type of teacher, and Edmundson's (1990) discussion of a 1989 report, *Studying the Education of Educators*, states that curricula must be redesigned to prepare teachers "who have the skills and attitudes necessary to contribute to ongoing school renewal efforts" (p. 718).

Sarason (1993) argues that educational reform rests primarily on classroom teachers, who assume the responsibility for making changes within their classes. He further noted that teacher education programs must help future teachers develop a considered philosophy of the process of teaching and learning and prepare them to implement their beliefs even if those beliefs are counter to the predominant culture of the school (Sarason, 1993). Edmundson (1990) agrees and states further that if teacher education programs do not provide the foundations, "new teachers will be unable to resist the powerful conservative effects of the schools and may themselves become the obstacles for change" (p. 722).

The Process of Change

Innovation and *the change process* is the subject of countless books and articles published during the past several decades. Researchers posit reasons for and against

change (Harvey, 1990; Kanter, 1992; Williams, 1972). Some researchers identify factors contributing to successful change (Ginsberg & Abrahamson, 1991; Howell & Higgins, 1990; Krostnoff, 1994; Shane, 1994).

Concurrently, numerous studies examine educational change. In a number of ways, educational change parallels change in business. First, as in business, educational change is inevitable. Second, there is resistance, which must be overcome for change to be implemented. And, third, change requires a commitment from individuals before it can be institutionalized, and it must be fully institutionalized before it will last. Of course, educational organizations are unique and, consequently, present their own set of issues.

According to Fullan (1991), educational change involves "two main aspects: what changes to implement (theories of education) and how to implement (theories of change)" (p. 46). These are interrelated, and both must be understood in planning reform efforts.

One of the most comprehensive studies of educational change was conducted by the Rand Corporation for the United States Office of Education (Berman, Greenwood, McLaughlin, & Pincus, 1975). A major conclusion from this study is that teachers' understanding and acceptance of the innovation is critical to implementation and institutionalization.

Miles and Louis (1990) postulate that the success of an educational change is based on two factors, will and skill. They state that the simple question, "Do you really want this?" is so basic that it often goes unasked, but that commitment by the teacher is critical to the program's success. The second factor is skill—teachers must be fully trained. Recent history is full of educational reforms that failed because those that were to implement them lacked the necessary training.

Higher education institutions have their own unique features that affect the process of curricular change and make change difficult to implement. According to Astin (1985) two of these factors are the rituals associated with the routine operations of the university and traditional faculty roles, including the assumption of faculty autonomy and expectations related to tenure. These issues must be addressed if successful change is to be implemented at the university level.

Learning Organization

Peter Senge proposes an approach to the creation of change based on his belief that the future of organizations and, indeed, the future of the entire planet, depends upon the ability of humans to understand the systemic nature of the universe and of change and to become a population that values learning (Dumaine, 1994). Senge (1990) proposes that organizations become learning organizations. He defines a learning organization and details how this concept can facilitate the process of change. According to Senge, persons create a learning organization by mastering five disciplines: personal mastery, shared mental models, building a common vision, team learning, and systems thinking. The use of these skills to expand patterns of thinking while "learning how to learn together"(p. 3) is imperative if innovations are going to take hold.

The first discipline, *personal mastery*, is the discipline of personal growth and learning. It is identifying one's vision while recognizing present reality and then managing the creative tension between the two. According to Senge (1990), "truly creative people use the gap between vision and reality to generate energy for change" (p. 153).

The second discipline is *mental models*, "deeply held internal images of how the world works, images that limit us to familiar ways of thinking and acting" (Senge, 1990, p.

174). Learners must be willing to expose the limitations of their own thinking, often to admit to being wrong. Only in being open and reflective can one recognize and challenge one's own mental models and keep them from becoming a barrier to learning.

Team learning is the ability of the team to learn together and think insightfully about complex issues. The value in the team is the potential for the intelligence of many minds to be more than that of one mind. Learning together, the team has a solid basis for creating a *shared vision*. It is that vision which establishes an overarching goal and pulls the members forward, overcoming the inertia of the status quo.

The fifth discipline is *systems thinking*. "Systems thinking is a discipline for seeing the wholes. It is the framework for seeing interrelationships, rather than things; for seeing patterns of change, rather than static snapshots" (Senge, 1990, p. 68). Systems thinking is the cornerstone of a learning organization. It integrates all of the other disciplines once they have been put into practice. It is the discipline that enables leaders to manage the complexities of the modern world.

Methodology of the Study

A qualitative research methodology was used to investigate curricular change. The principal method, naturalistic inquiry at the primary site, involved three means of collecting data. These were the following: (a) participant observation of a program as it underwent significant curricular revision, (b) interviews with persons directly involved in the change process, and (c) examination of written records kept during the process.

Concurrently, researchers conducted interviews at four other units within higher education institutions that had recently created and implemented curricular redesigns. The purpose of this research was to determine what factors facilitated and what factors

presented barriers to the process of curricular change. The researchers read the literature discussing change processes in general and in relation to education. They also focused on factors that are unique to higher education. Sites were selected that would provide opportunities for in-depth exploration of this topic.

The primary focus of the study was a school of education in the process of redesigning its curriculum. This site was selected because of the opportunity to participate in and observe the design process from the conceptualization to implementation. One researcher was present to observe actions and reactions of the participants, as well as the direction and redirection of the process, to interview participants, both formally and informally, throughout the process and to review documents relevant to the design and to the process. Additionally, she was able to bring an informed perspective from the literature to aid in interpreting the data gathered during the process.

Interviews were conducted at four other schools. These sites were selected because they were diverse, and each had a connection with the primary site. The first was a school of veterinary medicine in a large state research university in the southern United States. This school had recently adopted a completely problem-based curriculum. This site was selected because of the totality and the innovation of its redesign and because the redesign was to a problem-based learning model.

The second site, a pharmacy school at the university of the primary site, was selected because of the process it used to restructure its curriculum. The school of pharmacy used Total Quality Management tools to redesign its program as it moved from awarding a Bachelor of Science degree to a Doctor of Pharmacy degree.

The third site was a school of education that redesigned its curriculum to include case method in its teaching foundational courses. This site was identified through the National Council for Accreditation of Teacher Education (NCATE), in response to an inquiry into the use of cases in teacher education. The use of cases is a strategy for moving teacher education toward curricula that is less teacher-centered and more inquiry-based.

The final site was selected to investigate the barriers to curricular change from a different perspective. This site was a school of education in a large urban university in the southern United States that had designed and implemented an innovative curriculum. The innovation won a national award, and the participants from the school of education and local public schools were invited to Washington, DC to receive it. However, in less than two years, the program no longer existed. Researchers interviewed participants to gain insight into why this innovation did not succeed.

The research instrumentation used two of the three types of interviews described by Patton (1990). The first was the informal conversational interview that flows naturally during naturalistic participant observations. The second was a general interview guide which involved outlining a set of issues to be explored, but not being bound by the actual wording of questions. The guide served as a checklist to make sure that all relevant topics were covered during the interview but without a formal sequence of questions.

Data gathered through transcribed field notes and recorded interviews were analyzed to determine emerging themes. Researchers reviewed all material and identified categories and codes on a regular basis, according to guidelines suggested by Miles and Huberman (1994). These categories were subject to continuous modification as the study

expanded. Three matrixes, similar to those described by Miles and Huberman, were developed to help organize and order information and themes. The story from each site was reported in a case study, which Lincoln and Guba (1985) stated "is a fitting capstone to the *continuous* reporting process that characterizes naturalistic inquiry" (p. 358). Analysis and conclusions were reviewed by colleagues in the school of education and were sent to other participants for reactions and suggestions. From the themes that emerged, recommendations were made for a process of curricular change that can be used by interested schools of education.

Findings

Findings from the study validated a variety of issues identified in the literature. Those issues focused on (a) rationale for creating major curricular change, (b) the nature of change, (c) factors unique to teacher education institutions that impact change, and (d) the utility and feasibility of Peter Senge's model of a learning organization as a framework for curricular change.

The study found that major curricular changes within these five educational units were based on strong beliefs about what constitutes best educational practices. These were usually based on professional literature, reports from national studies in the field, and recommendations from professional organizations and accrediting bodies.

Each of the schools in this study held strong beliefs about encouraging higher order thinking and decision-making skills. Each school was moving away from a lecture-based to a more inquiry-based program. As the dean of the veterinary school shared his view of the rapidly escalating changes in veterinary medicine he noted, "When we got down to analyzing what we were asking students to learn, it just became overwhelming."

And, he added, the sad part was that retention two years later of material covered was probably less that 20 percent. This sentiment was echoed by study participants in the other schools who were motivated by the desire to produce not only knowledgeable but reflective practitioners in their professions.

A second focus of the study was the change process and factors that influenced the creation and implementation of innovations. Williams (1972) lists four barriers to change—*economic*, fear of being displaced or having income reduced, *emotional*, misunderstanding of the change or built-up prejudices; *cultural*, limitations and hang-ups that are a part of one's culture, *perceptual*, implication of criticism.

Comments from almost every study participant revealed observations of fear of job loss by faculty. They also revealed insecurity with new teaching and learning models, attachment to the status quo, and suspicion of unknown processes. These barriers had to be overcome in order to move forward with an innovation.

A major concern was that curricular revision would eliminate the need for one's specialty, thus resulting in the loss of a job. Interviewees noted that with problem-based learning the focus was no longer on expertise in a narrow field, but broad general knowledge. Would content experts be replaced by generalists? Faculty also revealed the frustration of giving up the position of the content expert. One participant summed up the feelings of many when he said, "It's just not much fun for a discipline expert to have to give up his course."

The study revealed that successful curricular redesigns addressed the issue of job loss as well as the concerns about new teaching models, comfort with status quo, and suspicion of new processes. All interviewees discussed the wide variety of faculty

development activities—workshops, seminars, shared readings, and faculty dialogue sessions. Faculty from the veterinary school and pharmacy school attended professional conferences and workshops that discussed the changing world views of their professions and ways to incorporate new models. Others held on-site workshops with nationally recognized leaders. Time to develop understanding and acceptance was a key factor in successful innovation.

Harvey (1990) describes sources of resistance to change. Some of these include (a) need for ownership, (b) perception of personal benefit, (c) support, (d) congruence with organizational norms, and (e) recognition.

Data gathered in the study indicates that individual resistance had to be overcome for innovations to be implemented. To overcome resistance to change, each school had to address the factors listed above. At schools where the redesign was successful, lack of ownership was overcome by involvement of the entire faculty in the redesign process. Leadership ensured that the faculty assumed ownership of the new curriculum and, to a large extent, of the change process. Benefits to faculty came in opportunities to attend professional conferences and in recognition by administrators and colleagues. Total faculty involvement prevented individuals from feeling that they were alone in implementing change. The new program did not conflict with the old because the innovation became the institutional norm.

At the school that was unsuccessful in its innovation, these resistance factors were not overcome. Only a small group of faculty were involved in the redesign. Other faculty members either did not attend, or did not contribute to open discussions about the innovation and, thus, did not take ownership. There were no personal benefits as a part of

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the redesign, faculty rewards were attached to other endeavors. The new program was in conflict with established norms. The failure to address these resistance factors contributed to failure of implementation.

Fullan (1991) identifies factors similar to the ones listed above. He also notes that changes are most effective when they are deep, rather than superficial. The Kostnoff study (1994) concludes that strong financial support and the availability of strong management support are among critical conditions for successful innovations. Numerous studies (Ginsberg & Abrahamson, 1991; Howell & Higgins, 1990; Shane, 1994) report the importance of champions in the implementation of an innovation.

Schools with successful innovations report that they began the new curriculum at a zero-base. That is, they began as if no curriculum existed, established desired program outcomes, and designed a program to meet those outcomes. Faculties achieving successful innovations also report adequate resources and strong administrative support. They note that issues of tenure and promotion were tied to involvement in the redesign process, as well as to other activities. Individual faculty members could identify the champions at their schools and noted the importance of high-visibility leaders. Not found in the literature but identified by study participants was the need for time and passion in creating successful change. An interviewee at the school which failed to implement it's innovation stated, "Anything less than passion will not lead to success."

Peter Senge (1990) presents the concept of a learning organization as a way to create, implement, and institutionalize change. According to Senge, the creation of a learning organization requires the mastery of five disciplines—personal mastery, mental models, shared vision, team learning, and systems thinking. In analyzing the data, the

researchers attempted to determine if these disciplines, although not specifically identified by the interviewees, were factors in creating successful change.

Faculty members challenged their own mental models and participated in team learning through sharing professional literature, open faculty discussions, visiting speakers, attending professional conferences and workshops, and visits to practice sites. Faculty worked together to establish a common vision or goal, which became the overarching guide for the redesign. Each school approached the design in a systemic way, including involving the entire faculty, and, in some cases, using a structured holistic process for the curricular development. Researchers found that Senge's concept was a valid model for creating curricular change.

Conclusions and Implications

This study identifies a variety of elements involved in successful curricular redesigns and validates Senge's model of a learning organization in creating and implementing innovation in education. Implications are that awareness of and attention to these factors will aid administrators of teacher education programs and programs in other educational units in creating and implementing successful program changes. The recommendations listed below are extrapolated from the analyses of the previous questions and are related to Senge's concept of the learning organization. They are organized under four major areas.

1. Participants in successful innovation must seek paths to personal mastery and challenges to existing mental models.

Curricular changes must be based on sound educational research and professional literature about best educational practices. Because curricular changes are difficult to create and implement, it is a waste of resources to initiate changes unless they are solidly grounded in valid research about most effective practices.

Curricular changes must be based on connections to the workplace. Universities must closely align preparation programs to the needs of the workplace so that graduates are prepared to meet the challenges of the real world.

Reflection time is critical for understanding and commitment. Acceptance of and adjustment to new ideas take time. Faculty must be given sufficient time to develop their own understanding and assume ownership.

Opportunities for learning are important. Faculty need to learn about the innovation, confront their own mental models, and encourage each other. Faculty benefit from numerous and varied opportunities to learn and grow professionally.

2. Team learning and a shared vision are important for faculty to work together for common goals.

Faculty need opportunities to learn and grow together. Learning together provides all faculty the same background upon which to build and helps develop common understandings.

A common vision within the faculty can build a base of understanding. With a base of common understanding, faculty can begin to form mutual goals. Faculty must be involved in creating the vision for the program and setting goals based on sound research and practice.

3. Change must be systemic.

An innovative curriculum must be a zero-based curriculum. Design must begin as if no curriculum exists. It is not sufficient to alter an old curriculum. Tinkering with an old curriculum usually results in simply adding more requirements to an inadequate program. It rarely brings innovation.

Faculty should be totally involved. Faculty members need to trust the fairness and reasonableness of the process as well as the outcome. Total involvement builds trust.

Diverse ideas should be valued. Effective innovation is best created by the collective wisdom of all individuals involved in the program. Open sharing of diverse ideas creates an environment for building common meaning.

Faculty must have ownership of the redesign. Faculty should design the innovation and, thus, gain ownership. Implementation of an innovation depends upon faculty commitment. Ownership of the design ensures commitment.

Concrete planning tools move the process in an orderly way. Excellent ideas can get bogged down without organization. Planning tools, such as TQM tools, can be used effectively to move through a process in an orderly way and bring order out of the chaos of diverse ideas.

Continuous assessment and adjustment are crucial. Processes and innovations must be evaluated continuously to determine if they are producing the desired outcomes.

4. Leaders should be supportive, not directive.

Leadership should be encouraged from within the faculty. When encouraged, leadership will emerge from within. Deans and other upper level administrators must be

supportive and provide affirmation and guidance throughout but allow others to lead the process.

Faculty members need reassurance from the outset about job security. Fear of and resistance to change is often economic. Faculty fear loss of their jobs as a result of the change. Reassurance that they will have a place in the redesigned curriculum will help alleviate those fears and, thus, eliminate a barrier to cooperation and success.

Resources must be provided. True innovations can rarely be implemented without some resources for faculty development, materials, and supplies.

Rewards to faculty are important. A raise in salary is appreciated, but usually is not critical to acceptance and implementation of an innovation. Recognition by administrators, improvement in the perception of the department, or the opportunity to attend a conference are rewards to faculty.

That change is inevitable cannot be disputed. The need to develop effective processes has been extensively documented in recent years. Sharing knowledge about processes that have been helpful in creating change will benefit administrators of all educational institutions.

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